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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No. : 10/519,394
Applicant : **SIEGELIN, Christoph**
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Art Unit : 2186
Examiner : CHRZANOWSKI, Matthew R.
Docket No. : 76.0733PR
Customer No. : 41754

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Commissioner for Patents
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AMENDMENT AFTER FINAL

Dear Sir:

In response to the Office Action of March 16, 2010 with a period for response to expire after April 16, 2010 (with an initial two-month's period for response expiring after March 17, 2010 in that March 16, 2010 fell on a Sunday), please amend the above-identified application as follows, and consider the accompanying remarks.

Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this paper.

Remarks/Arguments begin on page 10 of this paper.

Each section begins on a separate sheet in accordance with the revised format practice.

Amendments to the claims:

1. (Previously Presented) A method to write in flash type memory of an electronic module comprising:
 - defining a mirror area in the flash type memory divided into at least two physical areas each designated to correspond to a same logical area for storing content written to the logical area;
 - designating one of the at least two physical areas as being an active physical area; and
 - during a write to said logical area, programming the content of said logical area into the active physical area.
2. (Previously Presented) The method according to claim 1, further comprising:
 - erasing the content of all physical areas in a memory area in a single operation at a convenient time.
3. (Previously Presented) The method according to claim 2, wherein the convenient time is a period of inactivity or when all the physical areas are used.
4. (Previously Presented) The method according to claim 1, comprising copying the active physical area into a buffer area, erasing all physical areas and copying the buffer into a first available physical area in the mirror area.
5. (Previously Presented) The method according to claim 2 comprising performing the erasure and programming/read operations in parallel thereby not blocking the electronic module.
6. (Previously Presented) The method according to claim 5, comprising:
 - performing the erasure and programming/read operations in parallel in a bi-bank memory, said bi-bank memory corresponding to the mirror memory area each bank having physical area(s), one bank being used for programming/reading while the other bank is erased,

changing active bank when all physical areas of the bank used for programming/read have been used.

7. (Previously Presented) The method according to claim 1 comprising designating said active physical areas using a counter and incrementing the counter on each change of active area.
8. (Previously Presented) The method according to claim 1 comprising associating at least one bit with a logical area to represent the use state of at least one physical area of said logical area.
9. (Previously Presented) The method according to claim 1 wherein if the content of the logical area is identical to the content of the active physical area or when said write involves no erasure, the write is carried out in an active physical area and in a blank physical area in the mirror area otherwise.
10. (Previously Presented) The method according to claim 9, comprising programming only a portion of the logical area in the blank physical area.
11. (Currently Amended) An electronic module comprising information processing means and comprising a flash type non-volatile memory having a mirror memory formed from at least two physical areas each designated to correspond to a same logical area, each new programming operation to said logical area taking place in one of the physical areas of the mirror memory designated as an active physical area and if the new programming operation to the active physical area ~~cannot be achieved by not writing to the active physical area or by performing bit programming operations~~ requires writing a 0 into a location occupied by a 1 in the active physical area, thereby requiring erasure of the active physical area, designating a new active physical area.
12. (Currently Amended) A card comprising an electronic module having information processing means and a flash type non-volatile memory having a mirror memory formed from at least two physical areas each designated to correspond a same logical area, each new programming operation to said logical area taking place in one of the physical areas of the mirror memory

designated as an active physical area and if the new programming operation requires writing a 0 into a location occupied by a 1 in the active physical area, thereby requiring erasure of ~~to~~ the active physical area, designating a new active physical area.

13. (Currently Amended) A non-transient computer readable storage medium containing a computer program comprising program code instructions to cause a microprocessor to write in a flash type memory of an electronic module, wherein the computer program instructions comprise instructions for

defining a mirror area in the flash type memory divided into at least two physical areas, each designated to correspond to a same logical area for storing content written to the logical area, designating one of the physical areas as being an active physical area, and

during a write in said logical area, programming the content of said logical area in the active physical area.
14. (Previously Presented) The method according to claim 5, comprising designating said active physical areas using a counter and incrementing the counter on each change of active area.
15. (Previously Presented) The method according to claim 6, comprising designating said active physical areas using a counter and incrementing the counter on each change of active area.
16. (Previously Presented) The method according to claim 5, comprising associating at least one bit with a logical area to represent the use state of at least one physical area of said logical area.
17. (Previously Presented) The method according to claim 6, comprising associating at least one bit with a logical area to represent the use state of at least one physical area of said logical area.

18. (Previously Presented) The method according to claim 7, comprising associating at least one bit with a logical area to represent the use state of at least one physical area of said logical area.
19. (Previously Presented) The method according to claim 5, wherein if the content of the logical area is identical to the content of the active physical area or when said write involves no erasure, the write is carried out in an active physical area and in a blank physical area otherwise.
20. (Previously Presented) The method according to claim 6, wherein if the content of the logical area is identical to the content of the active physical area or when said write involves no erasure, the write is carried out in an active physical area and in a blank physical area otherwise.
21. (Previously Presented) The method according to claim 7, wherein if the content of the logical area is identical to the content of the active physical area or when said write involves no erasure, the write is carried out in an active physical area and in a blank physical area otherwise.
22. (Previously Presented) The method according to claim 21, comprising programming only a portion of the logical area in the blank physical area.
23. (Previously Presented) The computer readable storage medium of claim 13, wherein the computer program instructions further comprise instructions to erase the content of all physical areas in a memory area in a single operation at a convenient time.
24. (CANCEL)
25. (Previously Presented) The computer readable storage medium of claim 13 wherein the computer program instructions further comprise instructions to copy the active physical area into a buffer area, erasing all physical areas, and copying the buffer into a first available physical area in the mirror area.
26. (Previously Presented) The computer readable storage medium of claim 23 wherein the computer program instructions further comprise instructions to

perform the erasure and programming/read operations in parallel without blocking the electronic module.

27. (Previously Presented) The computer readable storage medium of claim 26, wherein the computer program instructions further comprise instructions to perform the erasure and programming/read operations in parallel in a bi-bank memory, said bi-bank memory corresponding to the mirror memory each bank having physical area(s), one bank being used for programming/reading while the other bank is erased, the method changing active bank when all physical areas of the bank used for programming/read have been used.
28. (Previously Presented) The computer readable storage medium of claim 13 wherein the computer program instructions further comprise instructions to designate said active physical areas using a counter incremented on each change of active area.
29. (Previously Presented) The computer readable storage medium of claim 13 or 23 wherein the computer program instructions further comprise instructions to associate at least one bit with a logical area representing the use state of at least one physical area of said logical area.
30. (Previously Presented) The computer readable storage medium of claim 13 wherein the computer program instructions further comprise instructions wherein the write is carried out in an active physical area if the content of the logical area is identical to the content of the active physical area or when said write involves no erasure, otherwise in a blank physical area in the mirror area that becomes the active physical area.
31. (Previously Presented) The computer readable storage medium of claim 30 wherein the computer program instructions further comprise instructions to program only part of the logical area in the blank physical area.
32. (Previously Presented) The method of claim 1, wherein each physical area has a status which is one of three statuses: blank, active and used.
33. (Previously Presented) The method of claim 32, wherein:

the blank status corresponds to one of the physical areas ready to receive data but not selected for receiving data,

the active status corresponds to one of the physical areas ready to receive data and selected for receiving data or to one of the physical areas containing the actual content of the logical area to be read,

the used status corresponds to one of the physical areas containing an outdated data that shall not be read, said physical area waiting for an erasure.

34. (Previously Presented) The electronic module of claim 11, wherein each physical area has a status, which is one of three statuses: blank, active and used.

35. (Previously Presented) The electronic module of claim 34 wherein:

the blank status corresponds to one of the physical areas ready to receive data but not selected for receiving data,

the active status corresponds to one of the physical areas ready to receive data and selected for receiving data or to one of the physical areas containing the actual content of the logical area to be read,

the used status corresponds to one of the physical areas containing an outdated data that shall not be read, said physical area waiting for erasure.

36. (Previously Presented) The card of claim 12 wherein each physical area has a status which is one of three statuses: blank, active and used.

37. (Previously Presented) The card of claim 36 wherein:

the blank status corresponds to one of the physical areas ready to receive data but not selected for receiving data,

the active status corresponds to one of the physical areas ready to receive data and selected for receiving data or to one of the physical areas containing the actual content of the logical area to be read,

the used status corresponds to one of the physical areas containing an outdated data that shall not be read, said physical area waiting for erasure.

38. (Previously Presented) The computer readable storage medium of claim 13, wherein each physical area has a status which is one of three statuses: blank, active and used.

39. (Previously Presented) The computer readable storage medium of claim 38 wherein:

the blank status corresponds to one of the physical areas ready to receive data but not selected for receiving data,

the active status corresponds to one of the physical areas ready to receive data and selected for receiving data or to one of the physical areas containing the actual content of the logical area to be read,

the used status corresponds to one of the physical areas containing an outdated data that shall not be read, said physical area waiting for erasure.

40. (Currently Amended) The method of claim 1 wherein the method further comprises:

determining whether a writing operation to the active physical area cannot be achieved by not writing to the active physical area or by performing bit programming operations because the writing operation requires writing a 0 into a location occupied by a 1 in the active physical area;

in response to determining that the writing operation to the active physical area cannot be achieved by not writing to the active physical area or by performing bit programming operations; requires writing a 0 into a location occupied by a 1 in the

physical area, designating an unwritten physical area in the mirror area as the active physical area; and

storing an indication that the active physical area is a written memory area.

41. (Currently Amended) The computer readable storage medium of claim 13 wherein the computer program instructions further comprise instructions to

determine whether a writing operation to the active physical area cannot be achieved by ~~not writing to the active physical area~~ ~~or by performing bit programming operations~~ because the writing operation requires writing a 0 into a location occupied by a 1 in the active physical area;

in response to determining that the writing operation to the active physical area cannot be achieved by ~~not writing to the active physical area~~ ~~or by performing bit programming operations~~, designating a new physical area in the mirror area as the active physical area; and

store an indication that the active physical area is a written memory area.

Remarks:

In the Office Action mailed on March 16, 2010, the Examiner rejected claims 1 – 23 and 25 – 41. Applicants amend claims 11-13, 40, and 41 herein. Claim 24 has previously been cancelled. Claims 1-23 and 25-41 are pending in the application.

Applicants amend Claims 11, 12, 13, 40, and 41 to clarify the issues for appeal. Claim 13 has been amended as the Examiner suggests. Claims 11, 12, 40, and 41 have been amended to include the limitation “in response to determining that the writing operation to the active physical area requires writing a 0 into a location occupied by a 1 in the physical area, designating an unwritten physical area in the mirror area as the active” (Claim 40, similar in Claims 11, 12, and 41). This limitation is supported by the specification, at least, at Page 7, Lines 7 – 11. Accordingly no new matter has been added.

The Claims**35 USC 101**

Claims 13, 23-31, 38-39 and 41 were rejected under 35 USC 101 because the claimed invention is directed to non-statutory subject matter.

The Examiner asserted that “Claim 13, as claimed, is merely drawn to non-statutory descriptive material since the claim is of a ‘computer readable storage medium’.” Office Action, Page 2, Lines 10-11. Claims 23-31, 38-39, and 41 were rejected as inheriting the alleged defect.

Applicants have amended Claim 13 to direct the computer readable storage medium to a non-transient computer readable storage medium as suggested by the Examiner to avoid any claims to non-statutory media such as propagated signals or carrier waves. As such, Claim 13 is directed to a particular apparatus (the computer readable storage medium) and is therefore directed to statutory subject matter.

Accordingly, Applicants respectfully request withdrawal of the rejection under 35 USC 101 and the allowance of Claims 13, 23, 25-31, 38-39 and 41.

35 USC 112, first and second paragraph

Claims 11, 12, 40 and 41 were rejected under 35 USC 112, first and second paragraphs for essentially the same reason, namely, the Examiner objected to the wording “cannot be achieved by not writing to the active physical area or by performing bit programming operations.” *E.g.*, Office Action, Page 3, Lines 4 – 6. What Applicant is getting at is that when writing to an area of a flash memory, the writing operation begins with a wholesale erasure of the entire area, followed by successive writes of logic high (“1”) to those bit-locations requiring a 1. Any writes of 0s to bit locations holding a 1 can only be achieved by erasing the entire memory area. Thus, if a byte 1010 1010 is to be written into a particular location, only the 1st, 3rd, 5th, and 7th bit are written. Now, if following that write operation another write to the same location occurs that attempts to write the byte 1010 1111, that write operation can also be performed because only logic low is changed to logic high (bits 6 and 8). However, if an attempt was made to write 1010 0000, that would not be possible to achieve by bit operations because bits 5 and 7 would require changing from logic high to logic low, thus requiring erasure of the entire memory area.

Applicants have amended Claims 11, 12, 40 and 41 to more clearly recite the subject matter of the invention. As amended these claims recite the limitation “in response to determining that the writing operation to the active physical area requires writing a 0 into a location occupied by a 1 in the physical area, designating an unwritten physical area in the mirror area as the active.” (Claim 40, similar in claims 11, 12, and 41). As amended, the claims have been corrected for the defects noted by the Examiner in regard to the 112 first and second paragraph rejections. Accordingly, Applicants respectfully request withdrawal of the rejection under 35 USC 112, second paragraph, and the allowance of Claims 11, 12, 40, and 41.

35 USC 102 and 103

Applicants have submitted the above amended the claims to clarify the issues for appeal, in particular, to remove the 35 USC 101 and 35 USC 112 issues from

appeal. However, the rejections under 35 USC 102 and 103 will be appealed.

Accordingly, Applicants defer addressing these rejections for the appeal.

CONCLUSION

It is submitted that all of the claims now in the application are in good condition for appeal. Applicants respectfully request entry of the amendments to the claims and reconsideration of the rejections under 35 USC 101 and 112. If the Examiner believes that the prosecution of the application would be facilitated by a telephonic interview, Applicants invite the Examiner to contact the undersigned at the number given below.

Applicants respectfully request that a timely Notice of Allowance be issued in this application.

Respectfully submitted,

Date: May 17, 2010

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